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United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine

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X A DEVICE FOR TRANSFERRING INSECTS FROM
HOLDING CAGES TO TEST CONTAINERS

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Division of Insects Affecting Man and Animals

The transfer of test insects, such as mosquitoes or flies, from a rearing or holding cage to a test container is usually accomplished by agitating the holding cage, attracting the insects by light or heat, or by using a mouth-operated suction tube. These methods are often slow and cumbersome. Furthermore, a true cross section of the population may not always be obtained. Occasionally, as many as 80 to 90 percent of the house flies taken from a rearing cage by these methods are males. The device described herein (figs. 1 to 4) was devised to facilitate the taking of insect samples. A somewhat similar battery-operated device, without the discharge feature, was described by Hills (1933) for the collection of beet leafhoppers for population counts.

Materials Required

- A. 1 - Tank-type vacuum cleaner having 1 3/4-inch intake and outlet.
- B. 1 - 3-foot length of flexible tubing, including metal tip furnished with the vacuum.
- C. 2 - Cardboard mailing tubes having an outside diameter of 1 3/4 inches.
- D. 1 - Piece of wood 2 by 4 by 3/8 inch.
- E. 1 - Piece of wood 2 by 2 by 1/2 inch.
- F. 1 - No. 12 cork.
- G. 1 - Piece of 5/8 inch-glass tubing, 2 inches.
- H. 1 - Piece of 1/2-inch rubber tubing, 3 feet.
- I. 1 - Folin blood sugar tube (or similarly constricted tubing).
- J. 1 - Copper screening (fine-mesh) 1/2-inch square.
- K. 1 - Piece of sheet aluminum, 3 by 3 inches.
- L. 2 - Pieces of strap tin, 1 by 12 inches.
- M. 2 - Bolts and accompanying nuts, 1 by 1/4 inch.
- N. 1 - Piece of glass tubing, 3 by 1 1/4 inches.

How to Assemble

Cut off metal ends of mailing tubes, thus forming cardboard cylinders (C). Press one of the cylinders into the outlet and one into the intake of the vacuum (A). Insert glass tube (N) into cylinder at outlet and secure in place. Attach the flexible tubing (B) to cylinder at intake (suction end) and bend tubing so that the openings of the glass tube at the exhaust and the metal tip of the flexible tubing are adjacent. The flexible tubing may be secured in place by attaching it to the body of the vacuum by metal straps (L). Drill two 1 3/8-inch holes in the 2- by 4-inch board (D) to receive the glass tubing and the metal tubing from the respective exhaust and intake. Insert these tube endings into the drilled holes and secure with an all-purpose liquid cement. Drill a 7/8-inch hole in the 2- by 2-inch wood piece (E), and a 3/4-inch hole in the 3- by 3-inch aluminum sheet (K). Align the holes of these two members and rivet the pieces securely. With a cork borer cut a 5/8-inch hole in a No. 12 cork (F) and insert the glass tube (G) into the cork. Press the cork (F) into the hole of piece E until it contacts K. The projecting edges of aluminum sheet (K) are molded over wood piece (D), thus forming a sliding union between the two pieces (D and E). The rubber tubing (H) is attached to G. Cut a hole in the bulb end of a Folin sugar tube (I) and attach the distal end of tube H to the constricted end of the Folin tube. Force the copper screening (J) into the Folin sugar tube to a position above the constriction of the tube.

Operation

Insects are collected from the rearing cage by turning on the vacuum, moving the sliding union so that it is in line with the intake, or suction, tube, and then inserting the Folin tube through the sleeve of the cage and rotating it at random within the cage. The insects are collected in front of the screening in the tube and are held there by the suction of the vacuum. When a sufficient number of insects have been obtained, the suction tube is withdrawn and its mouth is placed in an aperture of the test chamber. The sliding union is then moved in line with the exhaust tube and the insects are rapidly blown into the test chamber. A feature of the device is the adjustable amount of suction, which prevents fragile insects from being injured. Because of this feature, insects rarely escape during the transfer operation.

Literature Cited

Hills, Orin A.

1933. A new method for collecting samples of insect populations.
Jour. Econ. Ent. 26(4): 906-910.

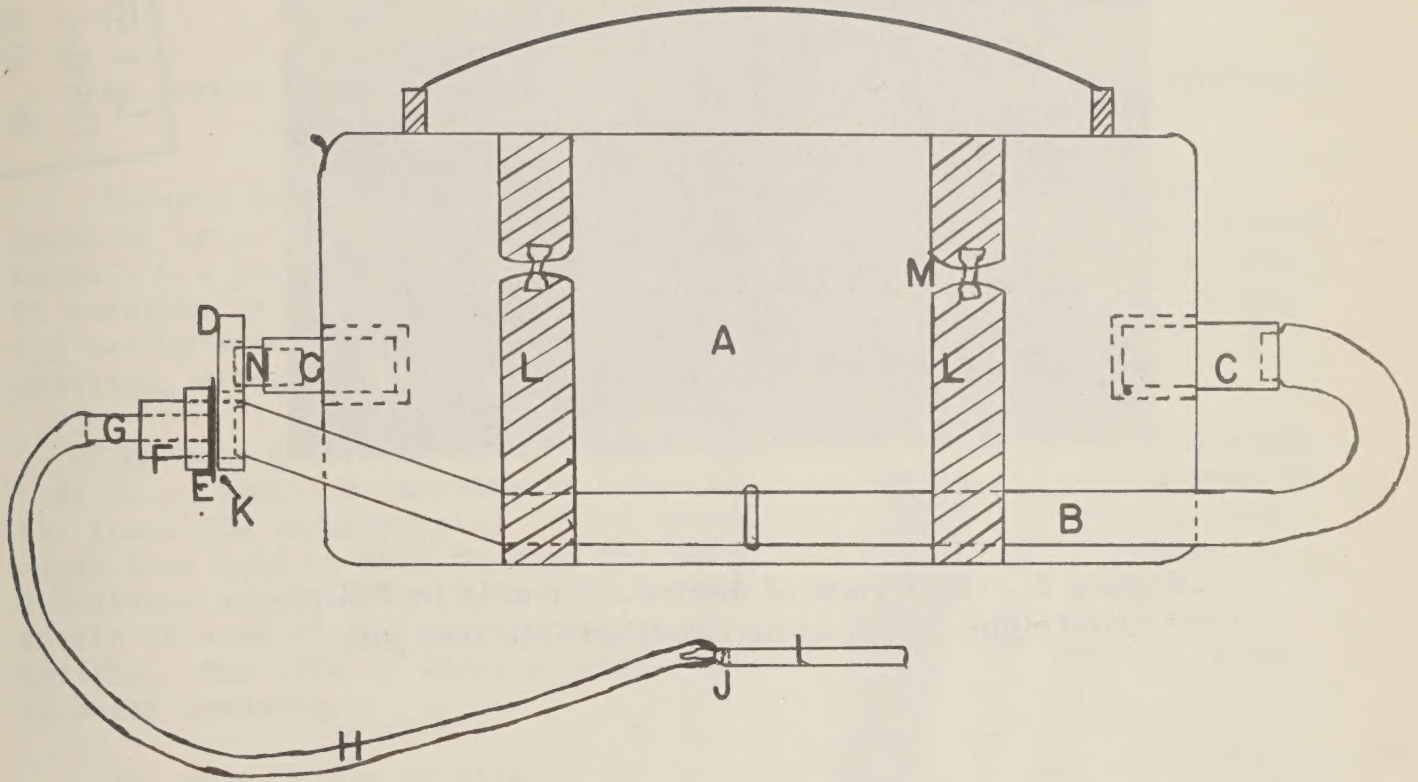


Figure 1. --Diagrammatical side view of device.

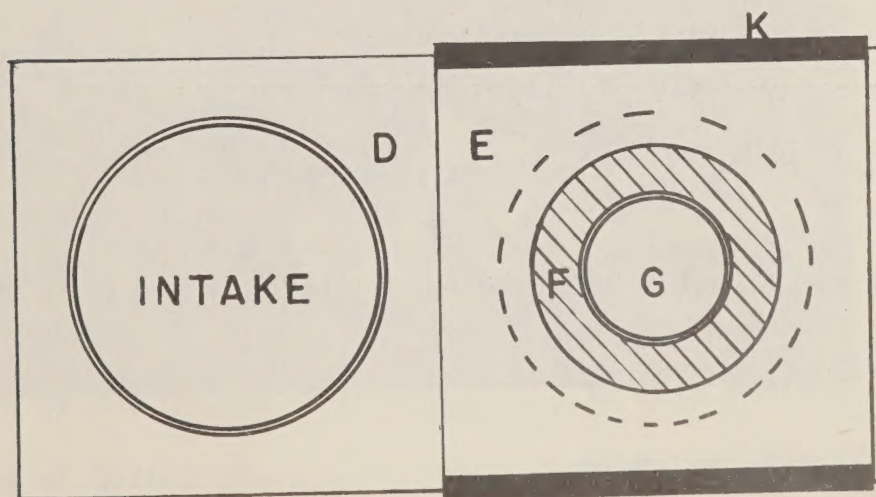
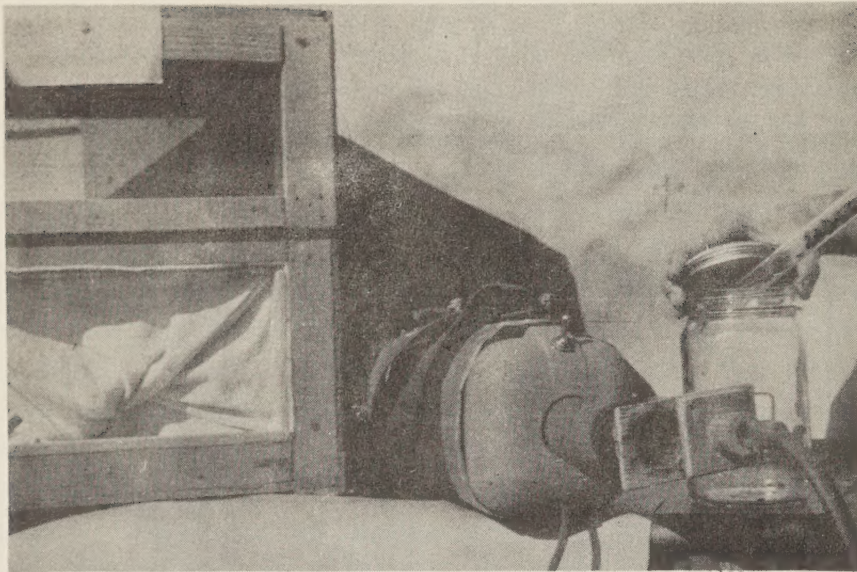


Figure 2. --Diagrammatical end view of sliding union (actual size).



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Figure 3. --End view of device. Insects in Folin tube (right) about to be expelled into test jar.

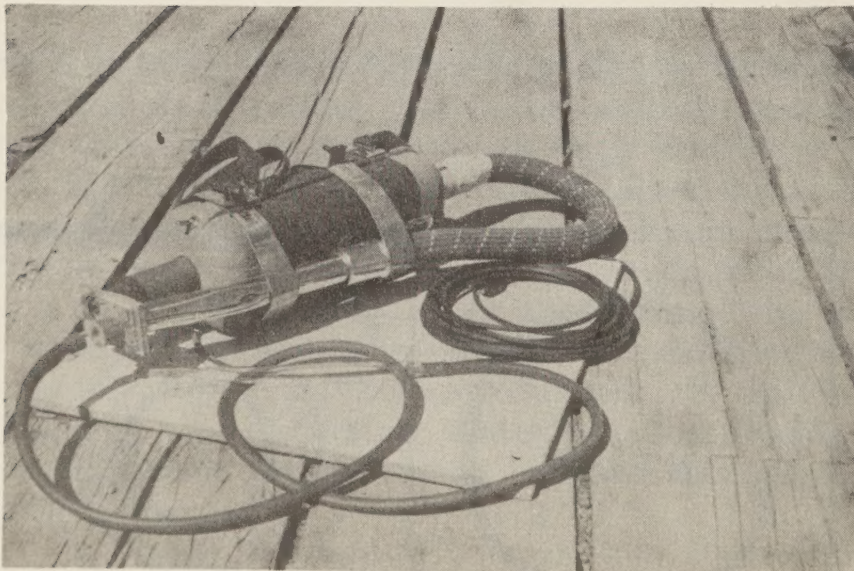


Figure 4. --View of entire device.